Allocution de Georges Vendryes
suite à la remise du Prix W. Bennett Lewis for Sustainable Energy
par Eric P. Loewen , Vice-President President Elect of ANS
SFANS, Paris, 16 septembre 2010

Dear friends, dear Eric,

Many thanks for your kind words. I feel greatly honoured to receive the Bennett Lewis Award, which bears the name of a world pioneer of nuclear energy whom I had the priviledge to know in person many years ago. I want to address warm thanks to Jan van Erp, who proposed my nomination, to all those who supported it, to the members of the Honors and Awards Committee and of the Executive Committee of the ANS Environmental Sciences Division who endorsed it. I am particularly grateful to Eric Loewen, for accepting to deliver this Award on the occasion of his visit to France, and to Jean-Claude Gauthier, for organizing this ceremony at the General Assembly of SFANS. On this happy day I will not fail to express my heartfelt thanks to my wife who over many years supported me in all senses of the word.

In selecting me the ANS had in mind to emphasize the major importance of the fast neutron breeder reactor, to which I devoted a large part of my activities during the many years I worked at the French CEA. Only through the remarkable phenomenon of breeding will nuclear energy rank among the sustainable and renewable energies and be able to bring a significant contribution to the growing energy needs of the world for an unlimited future.

France began to work in that field significantly later than the US, the UK and USSR. I may say that our starting point was in the United States. In 1954 Jules Horowitz and myself made a long tour of the American nuclear research centers which were just opening to foreign visitors in the wake of the Atoms for Peace appeal of President Eisenhower. At Argonne we had long discussions with Walter Zinn, who presented to us with his usual fire his new EBR2 project. His enthusiasm was so convincing and communicative that I took on the spot the decision to give up myself to launch as soon as possible a similar venture in my own country.

The necessary conditions were met three years later, and the project of the sodium-cooled fast neutron experimental breeder reactor Rapsodie was started under the direction of Pierre Zaleski. Our programme, covering all the techniques and industrial sectors of the sodium-cooled breeder reactors and their fuel cycle, expanded and developed regularly. It included two major steps. First the demo plant Phénix of 250 Mwe whose construction at Marcoule was managed by Rémy Carle, Jean Mégy and Michel Rozenholc. It started operation in 1973 and in 1998 ANS confered to it the much praised title of Nuclear Historic Landmark. As a follow-up was built at Creys-Malville the prototype Superphénix of 1200 Mwe, jointly owned by EDF, ENEL and RWE, which started operation in 1985.

On the whole this programme, which had become an exemplary model of European collaboration, progressed satisfactorily, in spite of many shortcomings and even failures of which I am fully aware. The main reason why we were able to overcome the many difficulties facing us and to move forward is to be found in the unfailing support we received during fourty years from the successive French governments at the highest level.

In November 1967 we were honoured to welcome at Rapsodie in Cadarache the visit of Général de Gaulle, who was followed two years later by Georges Pompidou. Both became ardent supporters of the fast neutron breeder reactor, in which they viewed a significant element to alleviate the energy dependence of our country. The same can be said of their successors, Valéry Giscard d'Estaing who took in 1976 the decision to build Superphénix, and of François Mitterand who repeatedly refused to shut it down, in spite of the pressures exerted on him by top members of his own party.

Over the years the breeder reactor became the main focus of the opposition of the antinuclear movements. for the only basic reason that it was the way for nuclear energy to last for ever. Their opposition, well organized on a multinational level and plentifully financed by vested interests in the oil and coal business, used all means at their disposal without hesitating to resort to extreme violences on occasion.

End of July 1977 tens of thousands of youg people on vacations from various countries gathered at Creys-Malville where the construction of Superphénix had begun. They were indoctrinated, enroled and thrown to storm the site by militants equipped with weapons, wearing crash helmets and goggles, waving anarchist black flags and well trained in guerilla warfare, whose declared objective was to cause all kinds of destructions. In the course of the fierce fights with the security forces in charge of protecting the site a young student was wounded to death. One night of January 1982 bazooka missiles were fired onto the plant under construction from the other side of the Rhône by a group of skilled international terrorists recruited and led by a green member of the Geneva Council. One of the rockets exploded within the reactor building. Fortunately none of the workers was injured.

On the political level opposition against the fast breeder started in the US in the wake of the Vietnam war and expanded rapidly throughout all Europe. In 1977 President Carter decided to stop the construction of the Clinch-River 300 Mwe breeder power plant at a time most big components were already being manufactured. Ten years later the Minister-President of the Nord-Rhein Westphalen Land in Germany, newly elected by a green-socialist coalition, refused steadfastly to sign the decree giving a legal existence to the SNR 300 breeder plant at Kalkar, whose construction had been completed in 1985 and to which all the necessary permits had been granted by the safety authorities. After years of obstruction the plant had to be dismanteld without operating a single day. In 1997, the new French socialist government decided without any debate at Parliament to put an end to the operation of Superphénix, only to keep promises made to the green party in a previous electoral arrangement,

For sure Superphénix had been plagued by too many technical problems during its first years of operation but the safety of the plant was never put into question. It was obliged to remain idle for a total of several years as a victim of lawsuits disputing unceasingly the detailed wording of its operating licence. After enduring youth diseases, Superphénix did not die from cancer or heart attack. It was intentionally murdered while it enjoyed perfect health. Over the twelve months of 1996, its last year of operation, it delivered to the electricity grid 3,4 billions of Kwh with an availability of 95% and only one incident at the lowest level 1 on the international scale.

In 1998 EDF received imperative instructions from the French ministry for environment to demolish immediately key parts of the nuclear island which would be extremely difficult to repair or to replace, with the clear objective to prevent any attempt to restart the plant later on. It was a will to kill.

It is useless to lament over an accomplished fact, whatever judgment one passes on those who are responsible for it, Nonetheless it is advisable to keep in mind what happened to draw lessons for the future.

The situation is now changing to evolve.

According to the best estimates the world energy consumption will about double till the middle of the present century. At present more than 80% of it comes from the burning of fossile fuels. It is widely recognized that this is becoming a cause of major problems. It is mandatory to increase as soon as possible the share in our energy mix of the sources which do not emit greenhouse gases. to promote renewable energies, in particular to pursue vigorous R&D programmes aiming at economical ways to master the direct conversion of solar energy, which offers a large potential for innovation. But each method has merits and drawbacks. To meet the previsible needs of mankind during the present century the use of nuclear energy at a large scale is an imperative in all scenarios.

Everyday now appear signs of its renewal in a growing number of countries. We all follow with great attention the regular progress of the procedures which will lead to the construction of new nuclear units in the US. We all know enough the dynamism and the competitive spirit of our American friends to be sure that, as soon as the renewal of nuclear energy in the US will take place, it will be spectacular. It will also have a driving effect on many other countries, notably in Europe.

In such a context it is not surprising to see the breeder reactor returning to the forefront of the international scene after a long interruption in the Western countries.

Meanwhile all the breeder plants which are to-day under operation or in construction are located outside of the Western world. All of them are made of sodium-cooled fast neutron reactors.

In Russia the BN600 power plant of 600 Mwe is operating regularly at Bieloiarsk in the Urals since 1980. On the same site is under construction a more advanced and bigger plant, BN800 of 800 Mwe, which will start operation withIn about two years . Designs of plants of unit power up to 1800 Mwe are on the drawing board. China which is currently preparing the nuclear start-up of a first experimental reactor of limited power, of Chinese design, has concluded an agreement with Russia in order to build with Russian assistance two copies of the above-mentioned BN800 plant adapted to the Chinese context. Last May, after years of debates, Japan put again in service the Monju reactor, which unfortunately will be once more shut down for a long period following a serious incident caused three weeks ago by a wrong move on its fuel handling system. In India, the operation at Kalpakkam of the small experimental reactor FBTR continues regularly, A power plant of 500 Mwe, PFBR, inspired by the late European project EFR, is under active construction on the same site. It is expected to start operation in 2012. The Indian government has already approved in principle the construction in close succession of four more identical plants. In South Korea the design of the Kalimer 150 Mwe prototype breeder reactor has been performed recently in the framework of a national long-term programme.

It is remarkable that all these countries, in spite of the extreme diversity of their political regimes, give a clear expression to the same will to move forward on the breeder line, as they are unanimous to recognize in it a basic need.

The same vision inspires the Generation 4 International Forum set up by the US several years ago. but so far the activities of most of its participants have remained in a state of long-term intentions.

In France CEA is at present carrying on the preliminary studies of an advanced sodium cooled fast neutron breeder reactor called Astrid which President Chirac instructed him early 2006 to design and to build. This decision is of course extremely welcome but one should not underestimate the tremendous efforts to accomplish to restore the previous French expertise which was acquired by decades of hard work and which has now been lost. Many obstacles have to be overcome before the construction of Astrid can begin.

As far as I know, no specific project to build a breeder reactor is yet under preparation in the US.

The present world juncture may be considered as a mere paradox, but its deeper meaning should not be overlooked. I cannot help to see in it a telling testimony, among others, of the spectacular rise of the Asian countries and a clear harbinger of the shift in the balance of power which is taking shape from the Western to the Eastern part of the globe.

I am well aware of the immense ressources of the US. I highly value the creativeness of the American society, the way it promotes innovation and progress through free enterprise. I have always admired the unique ability of your great nation to react to adverse events. In the course of the 20th century you succeeded to hold the foremost place in all areas of science and technology.

May I take the liberty to urge my American friends not to loose ground in the field where lies the ultimate goal of nuclear energy. At the Blue Ribbon Commission on America's Nuclear Future Eric just talked about recommandations are made in favor of closing the nuclear fuel cycle. This would be a prerequisite but only a first step on the way to the deployment of breeder reactors. I am sure that the ANS is ready to strive hard so that your country will regain the leading position it occupied for long years in this key sector. The best way for me to conclude my talk is to recall the warning expressed by Enrico Fermi in Los Alamos as early as 1945: « The country which first develops a breeder reactor will have a great competitive advantage in atomic energy ».

I thank you for your attention.